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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/607,014	06/29/2000	Seung Ho Hong	CU-2258 RJS	7334

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 11/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/607,014

Applicant(s)

HONG ET AL.

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 29 August 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 29 August 2002 for claim 10 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.
2. The drawings are objected to because Fig. 6 shows right-handed light reflecting off a mirror and remaining right-handed light (see also the specification, p. 12, lines 17-20 describing this figure). The examiner is under the impression that mirrors flip the handedness of the reflected light.

The applicant responded that "the left-right reversal characteristic of a mirror relates to perception of a viewer perceiving the virtual image formed behind the mirror" [p. 8] and that the figure is correct as drawn. This is not persuasive. The examiner was not referring to the "left-right reversal characteristic of a mirror" but rather to the actual handedness of the light reflected from the mirror. The examiner refers the applicant to the article by *Mourant et al.*, which on p. 369 states that "as mirror flips the helicity (i.e., the rotation direction) of the light".

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Response to Arguments

3. Applicant's arguments filed 29 August 2002 have been fully considered but they are not persuasive.

Claims 1 and 7 were previously rejected under 35 U.S.C. 112, 2nd paragraph, as being unclear in part due to confusion over whether n in the expression $(2n+1)\lambda/4$ was $n = 0, 1, 2, 3, \dots$ or $n = 1, 2, 3, \dots$. The amendments to claims 1 and 7 have removed this confusion.

Claims 1 and 7 were also rejected under 35 U.S.C. 112, 2nd paragraph, due to being unclear as to what wavelength λ was being referred to in the claims. The examiner suggested that λ was a particular value such as 550 nm, or the central wavelengths of the spectrums of individual colors R, G, B. The applicant responded that "the λ recited in the claims of the present application includes all wavelengths of the visible light spectrum." [p. 10] This statement appears to affect the scope of the claims in a dramatic way: if λ can be any wavelength in the visible spectrum (roughly 400 nm - 700 nm), then $(2n+1)\lambda/4$ can also be any value (higher than 100 nm), and almost any liquid crystal layer will have a retardation value satisfying the claims' limitation. The examiner wonders whether this was really the intent of the applicant, but in any case the scope of the claims is now clear, so the previous rejections under 35 U.S.C. 112, 2nd paragraph are withdrawn. New rejections over *Ohta* in view of *Kondo* are based on the new scope of claims 1 and 7.

The applicant argues that *Shigeno* "fails to teach or suggest a reflective liquid crystal display that does not utilize an optical component (such as a $\lambda/4$ wavelength

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plate)" [p. 12]. The applicant also makes similar comments regarding *Kwok* and *Hiroshi*. Claims 1 and 7 do not recite the limitation that the claimed device does not use an optical component such as a $\lambda/4$ wavelength plate, so this argument is not persuasive.

The applicant argues that the taking of "official notice" by the examiner is improper, but does not specifically traverse any of the statements which the examiner made. The examiner took official notice that "it is well-known in the art to use a fringe-field arrangement (or in-plane switching arrangement) with pixel and counter electrodes on the same substrate, ... motivated by advantages ... obtaining a wide viewing angle" [p. 5]. To further the prosecution, the examiner offers *Oh et al.*, U.S. Patent No. 5,844,644 [see col. 1, lines 25-31] as evidence for this statement. In the rejection, the examiner already offered *Hiroshi* as evidence of a statement regarding the rubbing directions. Again, the applicant did not traverse any of the statements made, and the examiner does not believe that the taking of official notice in this particular case causes any improper difficulties for the applicant.

Specification

4. The amended passage of the specification [on p. 14] refers to "the point of 0.9 retardation is $2n/\lambda$." This should be $2n\lambda/4$. Appropriate correction is required.

Claim Objections

5. Applicant is advised that should claim 7 be found allowable, claim 3 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two

claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ohta et al.*, U.S. Patent No. 6,266,116 in view of *Kondo et al.*, U.S. Patent No. 5,598,285.

Ohta discloses [see Figs. 1-2, for instance] a fringe-field switching mode LCD comprising a liquid crystal layer [LC], first substrate [SUB1] with counter electrode [CT] and pixel electrode [PX], second substrate [SUB2], first and second alignment layers [ORI1 and ORI2] rubbed anti-parallel [col. 18, lines 6-10], at an angle between 10° and 85° of the fringe field projection line [see Fig. 1 and col. 19, lines 55-57], and a polarizer [POL2] which can be made parallel to the rubbing axis [col. 19, lines 6-9]. The liquid crystal in *Ohta* has a retardation value of 316 nm, which satisfies the claim limitation when $\lambda = 421$ nm and $n = 1$ (see the above discussion regarding the question of the wavelength).

Ohta discloses a reflective plate [RM] below the light guide, so technically this limitation is met; however, though *Ohta's* device can be used in reflective-mode, it is not explicitly disclosed as being reflective. *Ohta* discloses using polarizers on both sides to make a transmissive-mode device. However, this is an art-recognized equivalent to putting a polarizing plate on one side and a reflective element on the other to make a reflective-mode device, as evidenced by *Kondo* [col. 1, lines 19-25]. Doing so does not affect the rest of the structure, and it would have been obvious to one of ordinary skill in the art to use the reflective mode, since it has advantages such as eliminating the need for a light source, reducing power consumption, and making the device lighter. Claims 1-4 and 7 are therefore unpatentable.

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Shigeno*, U.S. Patent No. 6,147,727.

Shigeno discloses [see Fig. 1, for instance] a reflective-type LCD having a liquid crystal layer which has a $\lambda/4$ retardation [col. 3, line 20], substrates [inherent] with homogeneous alignment layers [3L, 3U], a polarizer [70] disposed on the out side of the substrates, and a reflective plate disclosed on the other side. The operation of the device as shown in Fig. 1 is the normally-white operation shown in the present specification's Figs. 5 and 6. *Shigeno* does not disclose that the device is a fringe-field device with pixel and counter electrodes on the first substrate.

The examiner takes official notice that it is well-known in the art to use a fringe-field arrangement (or in-plane switching arrangement) with pixel and counter electrodes on the same substrate, and it would be obvious to one of ordinary skill to do so,

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motivated by advantages such as only having to construct electrodes on one of the substrates and obtaining a wide viewing angle. Claim 1 is therefore unpatentable.

9. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kwok*, U.S. Patent No. 6,341,001 in view of *Hiroshi*, U.S. Patent No. 6,323,927.

Kwok discloses [see Fig. 13, for instance] a reflective type LCD where, when the twist angle is zero (hence anti-parallel rubbings, see *Hiroshi* below) and the angle between the polarizer and the rubbing is 45° (as it is for Fig. 13), the appropriate retardation of the liquid crystal layer takes on the values 0.14, 0.41, 0.68, etc (estimating the centers of the contours) which correspond to the $(2n+1) \lambda/4$ retardation of claim 1. *Kwok* discloses the basic details of the structure (polarizer, liquid crystal, reflector, see col. 1, lines 58-60, etc.) but does not disclose the details of the electrodes or alignment layers.

The examiner takes official notice, as above, that this in-plane switching arrangement of electrodes and alignment layers is well-known (as disclosed in *Hiroshi*, especially the alignment layers providing anti-parallel rubbing axes, for example) and would be obvious to one of ordinary skill in the art, motivated as above. Claims 1, 2, 5, and 6 are therefore unpatentable.

The examiner also takes official notice that it is conventional in IPS devices that it is conventional to align the rubbing axes at an angle (between 10° and 85°) to the projection line of the fringe field (as shown in *Hiroshi*, Fig. 1c, for instance). It would be obvious to do so for one of ordinary skill, motivated among other reasons by the desire to use this conventional orientation which allows for good control of the liquid crystal

molecules with this electrode arrangement. Claims 3, 7, 9, and 10 are therefore unpatentable.

10. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kwok* in view of *Hiroshi* as applied to claims 1 and 7 above, and further in view of *Mori et al*, U.S. Patent No. 6,184,957.

Claims 4 and 8 recite the polarizer axis coinciding with the rubbing axis rather than being at an angle of 45° to it. As disclosed by *Mori* [col. 8, lines 4-10] for IPS-type devices this is merely the difference between a normally-white and normally-black mode. These are art-recognized equivalents in the field, so it would be within the ability of one of ordinary skill in the art to use a normally-white mode with the axes coinciding. Claims 4 and 8 are therefore unpatentable.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-4711 for regular communications and (703) 746-4711 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Andrew Schechter
November 13, 2002



TOANTON
PRIMARY EXAMINER